Science Flight Report
Operation IceBridge Antarctica 2010

Flight: **F09**
Mission: **TSK 2 Cryo**

Flight Report Summary

Aircraft	**DC-8 (N817NA)**
Flight Number	110114
Flight Request	118003
Date	Friday, November 19, 2010 (Z), Day of Year 323
Purpose of Flight	Operation IceBridge Mission TSK2Cryo
Take off time	17:42:33 Zulu from Punta Arenas (SCCI)
Landing time	04:30:29 Zulu at Punta Arenas (SCCI) on Saturday, November 20, 2010
Flight Hours	10.9
Aircraft Status	Airworthy.
Sensor Status	All installed sensors operational.
Significant Issues	None
Accomplishments	• Low-altitude survey (1,500 ft AGL) of two ICESat and two CryoSat ground tracks. • Completed entire mission as planned. • ATM, MCoRDS, Snow and Ku-band radars, gravimeter, LVIS, POS/AV, and DMS were operated on the survey lines. • Conducted a ramp pass at Punta Arenas airport for ATM, LVIS instrument calibration (1,500 ft AGL). • Conducted pitch and roll maneuvers for LVIS calibration over Drake Passage.
Geographic Keywords	Antarctica, Thwaites Glacier, Pine Island Bay, Marie Byrd Land, Smith Glacier, Kohler Glacier, Bear Peninsula, Abbott Ice Shelf.
ICESat/CryoSat Track	CryoSat tracks 3258, 3272 and ICESat tracks 0190 and 0035.
Repeat Mission	2009 ICESat tracks

Science Data Report Summary

Instrument	Instrument Operational			Data Volume	Instrument Issues
	Survey Area	Entire Flight	High-alt. Transit		
ATM	☑	☒	☒	50 GB	None
MCoRDS	☑	☒	☒	1.1 TB	None
Snow Radar	☑	☒	☒	220 GB	None
Ku-band Radar	☑	☒	☒	220 GB	None
LVIS	☑	☒	☑	90 GB	None
DMS	☑	☒	☑	64.6 GB	None
POS/AV (510 + 610)	☑	☑	☑	2 GB	None
Gravimeter	☑	☑	☑	80 MB	None
DC-8 Onboard Data	☑	☑	☑	40 MB	None.

Mission Report (Michael Studinger, Mission Scientist)

Today's mission is a new design. It is a partial repeat of the October 18, 2009 IceBridge flight. It overflies two of the ICESat lines flown then, but replaces the other two with CryoSat-2 ground tracks. One of these is a descending track over the western portion of the Thwaites catchment, which smoothly and monotonically descends from the plateau toward the Amundsen Sea. The other is an ascending track over the Pine Island catchment and occupies terrain which undulates with a variety of slopes and aspects. Both lines extend far enough inland to capture the switch in CryoSat mode mask from Synthetic Aperture Radar (SAR) to Low Resolution Mode (LRM). CryoSat-2 overflew the Thwaites line earlier this morning before our flight. The Pine Island line was flown by CryoSat-2 just an hour after we left the line.

The weather in the survey area was great and what we had expected from the forecast. This was by far the best forecast we have seen for PIG since we arrived.

During the turn between waypoints CSA99 and 003508 we stayed 16 nautical miles away from the newly discovered penguin colony on Bear Peninsula.

The pilots did a great job today staying at 1,500 ft AGL which greatly helped collecting good snow and Ku-band and MCoRDS data in the designed passband.

All instruments worked well and we recorded good data on this flight. In addition to the survey lines we were able to collect brief segments of LVIS and DMS data over small cloud free areas over sea ice in the Bellingshausen and Amundsen Seas.

Individual instrument reports from experimenters on board the aircraft:

ATM: Both ATM system worked well and collected good data along the entire survey line.

MCoRDS: The MCoRDS radar worked well and collected 1.1 TB of data.

Snow and Ku-band radar: Both systems worked very well. The pilots did a great job staying very close to 1,500 ft AGL all times which greatly helped collecting good data.

Gravimeter: Worked well. No issues.

DMS: DMS worked well.

LVIS: The LVIS system worked very well. The system collected data on the inbound and outbound transits and collected narrow swath data over the low-altitude survey lines. On the return transit home some minor frost may have developed on the window, which will be looked at after landing.

POS/AV: Systems worked well. No issues.

DC-8 on board data: Worked well. No issues.

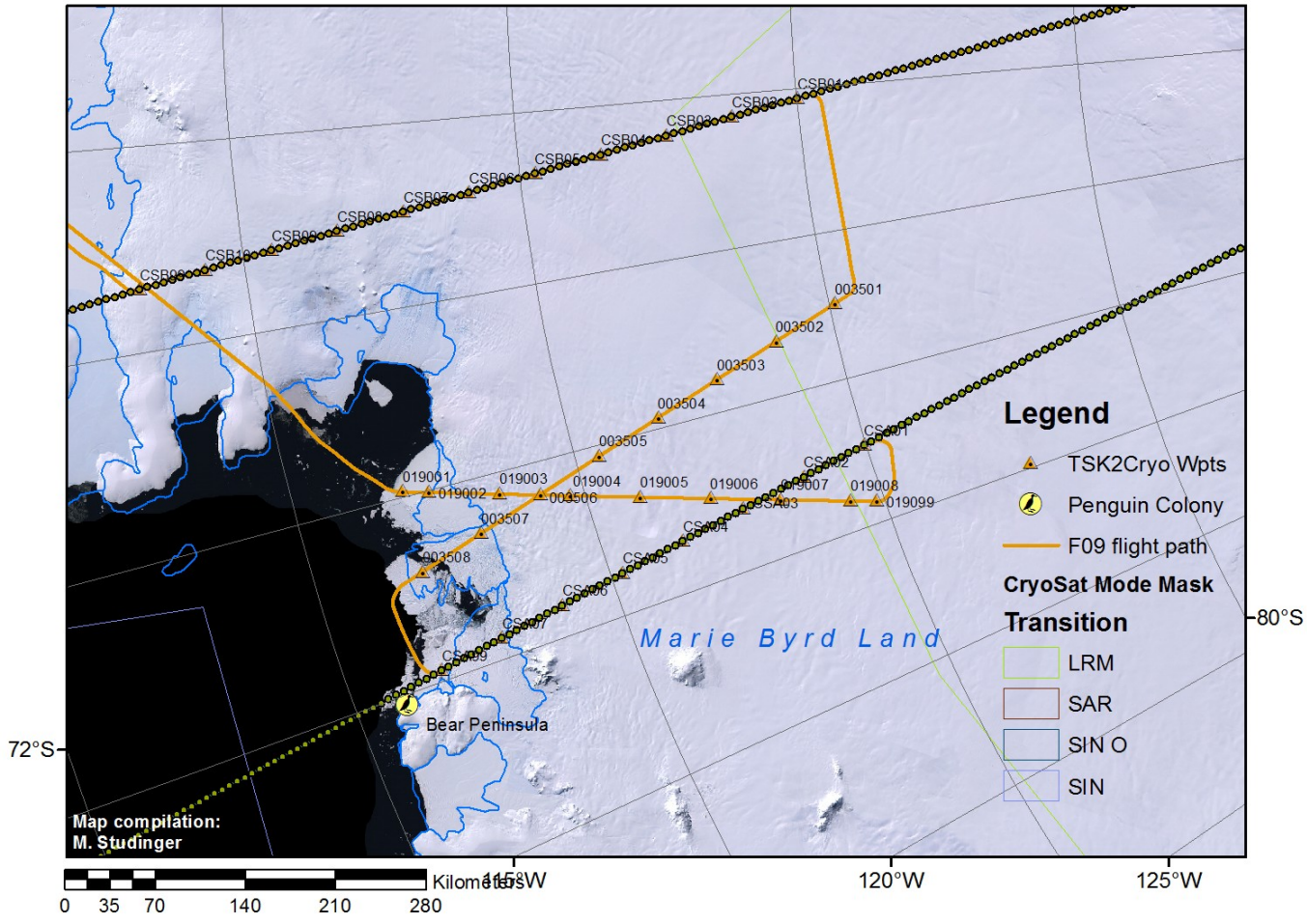

Figure 1: Flight path of today's mission TSK2Cryo along two ICESat and two CryoSat orbits.